

ÄKTAmicro™

Installation Guide



Important user information

All users must read this entire manual to fully understand the safe use of ÄKTAmicro.

Important!

ÄKTAmicro is intended for research use only, and should not be used in any clinical or in vitro procedures for diagnostic purposes.

Safety notices

This manual contains warnings and cautions concerning the safe use of the product. See definitions below.



WARNING! The WARNING symbol and notice highlight instructions that must be followed to avoid personal injury. Do not proceed until all stated conditions are clearly understood and met.

CAUTION! The CAUTION notice highlights instructions that must be followed to avoid damage to the product or other equipment. Do not proceed until all stated conditions are met and clearly understood.

Notes

Note: A Note is used to indicate information that is important for trouble-free and optimal use of the product.

Recycling



This symbol indicates that the waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of equipment.



WARNING! This is a Class A product. In a domestic environment, it might cause radio interference, in which case the user might be required to take appropriate measures.



WARNING! All repairs should be done by personnel authorized by GE Healthcare. Do not open any covers or replace parts unless specifically stated in the instructions.

CE-certification

This product complies with the European directives listed below, by fulfilling corresponding standards. A copy of the Declaration of Conformity is available on request.

- 73/23/EEC, Low Voltage Directive
- 89/336/EEC, EMC Directive

The **CE** logo and corresponding declaration of conformity, is valid for the instrument when it is:

- used as a stand-alone unit, or
- connected to other CE-marked GE Healthcare instruments, or
- connected to other products recommended or described in this manual, and
- used in the same state as it was delivered from GE Healthcare except for alterations described in this manual.

Note: The Declaration of conformity is valid only for systems that are marked with the **CE** logo:



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1 About this installation guide

ÄKTAmicro is assembled and fully tested before shipping.

For safe transportation, however, some components have been secured and thus need to be detached before the system can be tested and used.

Cables, capillaries, accessories, etc. are enclosed in paper boxes or in Box-900 located at the top of the instrument pile.

This guide describes how to install ÄKTAmicro. The guide is divided into two parts; one describing the installation and one describing how to run the installation test. After the installation procedure has been performed, your ÄKTAmicro is ready for purification work.

For full details of specifications, methods, maintenance etc., refer to the respective User Manuals and Instructions.

2 Safety

- The system is designed for indoor use only.
- Do not use in a dusty atmosphere or close to spraying water.

Refer to Technical Specifications in the System Manual for detailed environmental pre-requisites.



WARNING! The ÄKTAmicro system operates under high pressure. Eye protection must be worn at all times.



WARNING! The individual modules must not be opened by the user. They contain high voltage circuits that can give a lethal electric shock.



WARNING! Monitor UV-900 uses high intensity ultra-violet light. Do not disconnect the optical unit while the lamp is ON.



WARNING! ÄKTAmicro must be connected to a grounded mains socket.



WARNING! There must always be a sample loop connected to ports 2 and 6 of the injection valve. This prevents liquid spraying out of the ports when switching the valve, which is especially dangerous if hazardous chemicals are being used.



WARNING! Two people are required to lift the system.



WARNING! Never block the flowpath outlet, since this will create over-pressure and may result in injury.



WARNING! Only spare parts approved or supplied by GE Healthcare may be used for maintaining and servicing the system.



WARNING! Never place waste containers on the top of the system. If they become full and overflow, liquid may penetrate the system causing a short-circuit.

3 Pre-requisites



WARNING! ÄKTAmicro must be connected to a grounded mains socket.

- Two people are recommended to lift ÄKTAmicro onto the working bench.
- To install ÄKTAmicro, a working area of about 200 × 80 cm is required.
- ÄKTAmicro requires 100 to 120/220 to 240 VAC, 50/60 Hz electrical supply with safety grounding.
- Cutting pliers are recommended for cutting plastic straps.
- A waste flask.

IMPORTANT! Before using ÄKTAmicro equipment, read all the safety information in section 1.2 in *ÄKTAmicro System Manual*.

The installation test requires the following solutions:

- 200 ml of distilled water for priming and purging the pump.
- 100 ml of 0.4% acetone in distilled water.
- 100 ml of 20% ethanol in distilled water.

4 Installation overview

- Unpack ÄKTAmicro *page 11*
- Detach secured items, and install items enclosed *page 12*
- Unpack and install the computer *page 14*
- Connect mains power cabling *page 14*
- Connect UniNet 1 data communication chain cabling *page 14*
- Complete the first two sections of the installation record *page 27*
- Prepare ÄKTAmicro for the installation test *page 16*
- Run the installation test method *page 20*
- Evaluate the gradient *page 24*
- Evaluate the step response *page 24*
- Evaluate the UV response *page 25*
- Complete the test record *page 26*
- Complete the registration form *page 29*
- Complete the final section of the installation record *page 27*
- Store photocopies of all records and forms in the System Logbook.
- Store the Installation Guide in the User Manual box.

5 Installation of ÄKTAmicro

Begin by creating a clean and dry working area of 200 × 80 cm that allows easy access. Then follow the step-by-step instructions below and fill in the installation record as you go along, see page page 27.

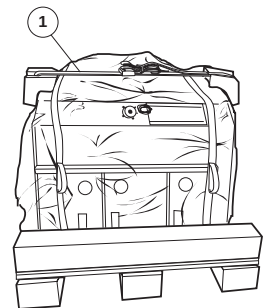
Note: Some components are packed in Box-900, located at the top of the system.

Note: Some packing lists are included in the paper boxes.

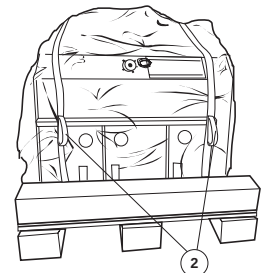
5.1 Unpacking

- 1 After having removed the cardboard hood, check the contents against the attached packing list. Check also all included boxes. Store all the enclosed paper boxes and plastic bags in a convenient nearby place.

- 2 Release and remove the red strap (1) holding the system to the pallet.



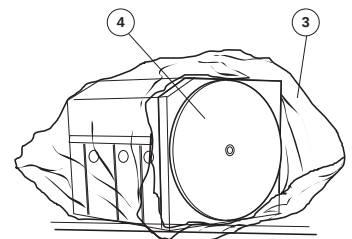
- 3 Lift ÄKTAmicro onto the work area using the four strap handles (2). Two people are required to lift the system. Do not raise to upright position yet. Lay the system on the same side as on the pallet.



- 4 Release the two red straps with the strap handles. Allow the straps to remain taped to the plastic cover.

- 5 Pull back the plastic cover (3) to uncover the swivel platform (4) and raise the system to an upright position.

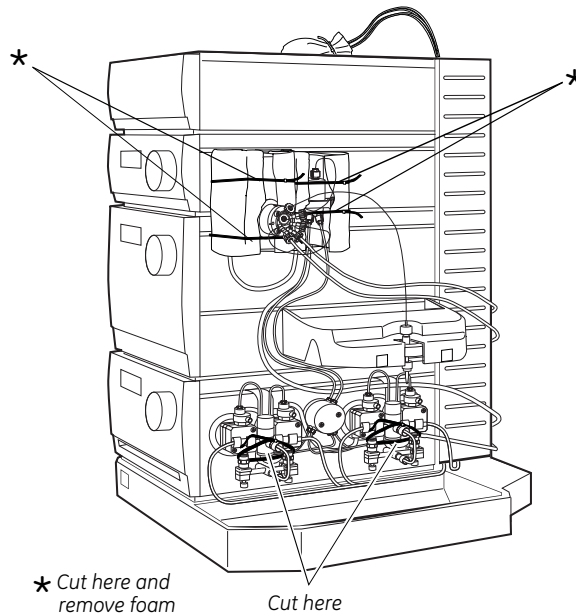
- 6 Remove the plastic cover with the red straps from the system.



5 Installation of ÄKTAmicro

- 7 Save all the original packing material. If, for any reason, the equipment has to be repacked, for transportation or otherwise, it is important that the system can be safely packed using the original packing material.
- 8 Turn ÄKTAmicro on its swivel platform to access the fluid component side of the system.
- 9 Detach the following items by cutting straps and removing red tape. Also remove the desiccant bags.

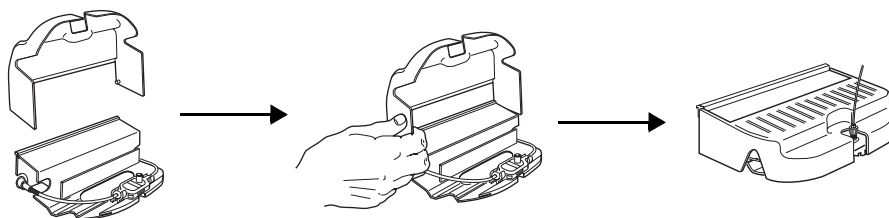
Note: Use cutting pliers. Be careful not to cut any capillaries by accident. Make sure not to lose any of the capillary marking tags.



- Plastic hood covering the Injection Valve and the Mixer, including the PEEK tubings.
- Injection Valve INV-917, located at the top left side. Detach the valve from the attachment bracket to remove the protective foam, and reposition the valve to the slot in the attachment bracket.
- Mixer M-925, located next to INV-917. Detach the Mixer from the attachment bracket to remove the protective foam, and reposition the mixer to the same slot in the attachment bracket.
- SV-903A and SV-903B, located between the pump heads on P-905.

- UV cell cover, located above the UV flow cell. Remove the red tapes.
 - Capillary loops. Remove the red tape holding the capillary loops attached to INV-917 (waste capillaries W1 and W2).
- 10 Place the waste tubings W1 and W2 in waste bottles and place the bottles in front of ÄKTAmicro, or wherever convenient.
 - 11 Unpack the inlet tubing fixed in a plastic bag taped to the buffer tray on top of Box-900.
 - 12 Make sure all items are securely fitted, and that no capillary connection has worked loose, or been tangled.
 - 13 Attach the column holder enclosed in Box-900 above the UV cell. Select a slot to suite the height of the column to be used.

Should the cover over the UV cell compartment come loose, it is refitted in the following way:



- 1 The cover is a simple push fit onto the cell holder. Two small lugs on the cover locate in holes at the front and rear of the cell holder.
- 2 The cover is then lowered over the cell holder.

Note: You can select a fraction collector, an autosampler or an MS-unit as optional components. Installing the fraction collector and the autosampler is described in the ÄKTAmicro Optional Configurations User Manual. The MS must be installed by authorized service personnel.

5.2 *Installing the computer and the UniNet cables*

- 1 Unpack and install the computer and printer according to the manufacturer's instructions. Place them to the left of the system. Do not switch them on!

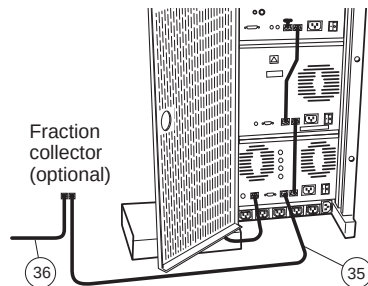
CAUTION! The mains power to ÄKTAmicro must be switched OFF before the UniNet 1 cabling is installed.

- 2 Complete the UniNet 1 data communication chain by connecting a UniNet 1 cable between the computer and Pump P-905.

CAUTION! The UniNet connection to the computer **MUST** be made to the board with four LEDs (37).

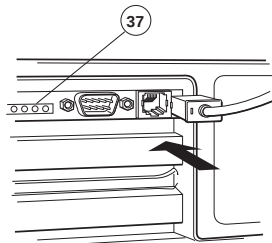
- 3 If using a fraction collector, connect the UniNet 1 cable (35) between Pump P-905 and the fraction collector, and UniNet 1 cable (36) between the fraction collector and the computer.

- 4 If using an autosampler, the UniNet 1 cable is routed via one of the UniNet 1 connectors in the autosampler before connecting to the computer.



All other UniNet 1 cables are connected at delivery.

An MS-unit used with the ÄKTAmicro system communicates through serial standard cables with the computer. See the documentation of the MS-unit to connect the unit.

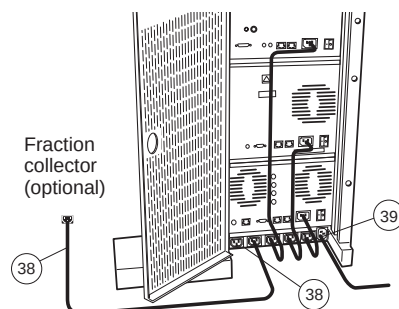


5.3 Connecting the mains cables



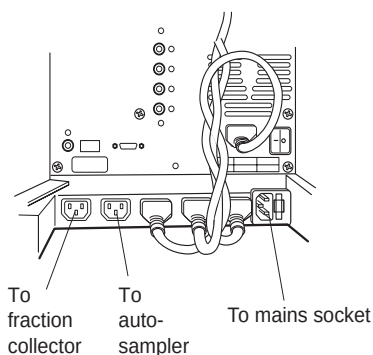
WARNING! ÄKTAmicro must be connected to a grounded mains socket.

- 5 Connect a mains cable (39) supplied between ÄKTAmicro and a properly grounded mains socket. Do not switch on!



- 6 If using a fraction collector, connect a mains cable supplied (38) between the fraction collector and a mains socket at the rear of ÄKTAmicro.

- 7 If using an autosampler, connect a mains cable between the autosampler and a mains socket at the rear of ÄKTAmicro.



- 8 Complete the two first sections of the Installation record on page *page 27*.

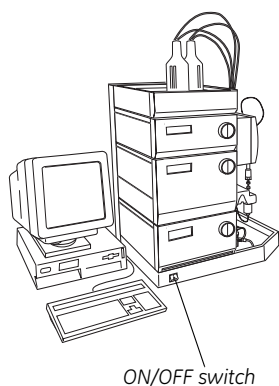
The installation phase of ÄKTAmicro is now completed!

6 Installation test

The installation test checks the function of the solvent delivery and the UV monitoring system of ÄKTAmicro. The installation test can also be used at any time to check the condition of the system, e.g. for calibrating the system regularly or after a prolonged stop.

Correct gradient formation is tested by producing a linear gradient and a series of concentration steps of acetone.

Correct UV monitoring is tested by monitoring the acetone concentration at 265, 254 and 280 nm and calculating the absorbance ratios 265/254 nm and 265/280 nm.



ON/OFF switch



6.1 Start up the ÄKTAmicro system

6.1.1 Start up the ÄKTAmicro separation unit

- 1 Switch on the separation unit using the **ON/OFF switch** located to the left on the base platform.

6.1.2 Start up the computer and the UNICORN software

- 1 Switch on the computer, the display and the printer according to the instructions in the manufacturer manuals.
- 2 Log into Windows™ by first pressing **Ctrl-Alt-Del**, and then clicking on **OK**.
- 3 When the Windows desktop appears, start UNICORN™ by double-clicking on the UNICORN icon.
- 4 Select user **default** and enter **default** as password. Click on **OK**.



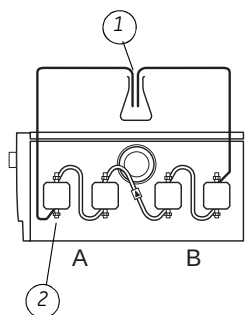
- Click on the **System Control** button in the task bar.

System Control Button



6.2 Preparation of Pump P-905

6.2.1 Priming and purging Pump P-905



- Immerse the rinsing tubing in a flask (1) containing 20% ethanol in distilled water.
- Connect a syringe to the rinsing tubing that is connected to the underside (2) of the left pump head on pump A. Slowly draw rinsing solution to the syringe. When rinsing solution starts to enter the syringe, continue to draw a few milliliters.
- Loosen the syringe and immerse the tubing in the rinsing solution (1).

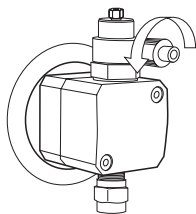
Purge Pump P-905 as follows:

To turn the purge valve a 10 mm spanner is required. The torque used to tighten the valve is 1.2 to 1.8 Nm.

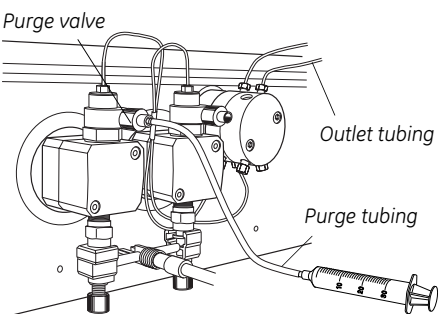
- Immerse the inlet tubing of all pump modules, with filters, in a distilled water flask.

Note: Never place the flask below the level of the pump inlet.

- Connect a male Luer syringe of about 30 ml to the open end of the purge tubing.
- Connect a male Luer connector at the other end of the purge tubing to the left purge valve at pump module A.
- Turn the purge valve counter clockwise half a turn to open it and slowly draw eluent into the syringe.



- 5 When fluid starts to enter the syringe continue to draw a few milliliters before closing the purge valve. Check that there is no visible air left in the inlet tubing.
- 6 Repeat steps 3 to 5 for the other pump heads.



6.2.2 Setting compression compensation

When running Pump P-905 at high pressures, flow losses might occur due to the compression of the eluent. Pump P-905 has functions that compensate for these flow losses.

Note: The compensation functions should be activated at all times.

With the compensation function activated, the pump takes into consideration the given compressibility for the liquid, at the actual pressure.

Some common values are given below:

Liquid	Value in Pa-1
Water	4.6×10^{-10}
Methanol	12.1×10^{-10}
Most other organic solvents, e.g. ethanol	11.0×10^{-10}

Before starting the installation test, make sure that the compensation value is set to $4.6 \times 10^{-10} \text{ Pa}^{-1}$ (for water).

To set the compression compensation:

- 1 Turn the front selection Dial on the pump.
- 2 Select main menu **Setup**, press **OK**.
- 3 Select sub menu **Setup Compr. comp**, press **OK**.
- 4 Change numbers accordingly and select **On** to activate the compensation. Press **OK**.
- 5 Select sub menu **Setup Start comp**, press **OK**.
- 6 Select **On** to activate the start compensation. Press **OK**.

Setup Compr. comp
(off) off on

Setup Start comp.
(off) off on

Setup Compr. value A
(4.6E-10) 4.6

- 7 Select sub menu **Setup Compr. value A**, press **OK**.
- 8 Enter compensation value $4.6 \times 10^{-10} \text{ Pa}^{-1}$ for pump module A.

Setup Compr. value B
(4.6E-10) 4.6

- 9 Select sub menu **Setup Compr. value B**, press **OK**.
- 10 Enter compensation value $4.6 \times 10^{-10} \text{ Pa}^{-1}$ for pump module B.
- 11 Press **ESC, ESC -> END**

6.2.3 Testing pressure stability

Perform a pressure test to establish that all air has disappeared from the pump heads. Perform as follows:

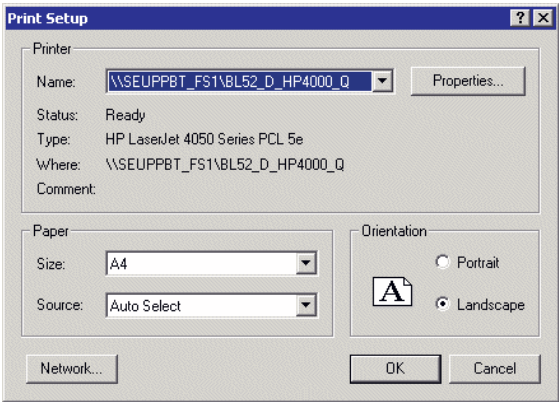
- 1 Connect a capillary between port 1 on the Injection valve to the inlet of the UV optical unit.
- 2 Run 0.2 ml/min at 0% B (distilled water). Check on the pump display that the pressure reading is stable (variation $< \pm 5\%$).
- 3 Run 0.2 ml/min at 100% B (distilled water). Check on the pump display that the pressure reading is stable (variation $< \pm 5\%$).
- 4 Proceed to step 5 if the pressure is stable. If not, consult the Pump P-905 User Manual for trouble-shooting instructions.
- 5 Click on **END**.
- 6 Transfer the inlet tubing B1 into a flask containing 100 ml of 0.4% acetone in distilled water.

Installation Test Method Guide

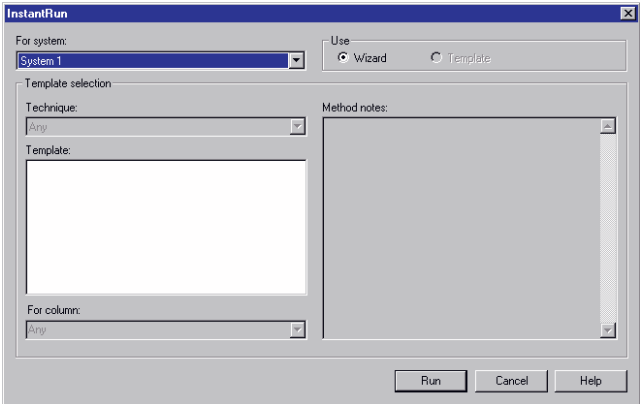
Buffer A:	Distilled water
Buffer B:	0.4% acetone in distilled water
Test flow rate:	1 ml/min
Test run time:	Approximately 30 minutes

6.3 Running the installation test method

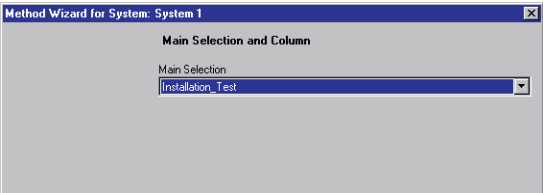
- 1 In **UNICORN Manager** module, select **File:Printer Setup....** Select the appropriate printer from the list and select **Landscape**. Then click **OK** to acknowledge the printer chosen.



- 2 In **System Control** module, select **File:Instant Run**. The **Instant Run** window opens.



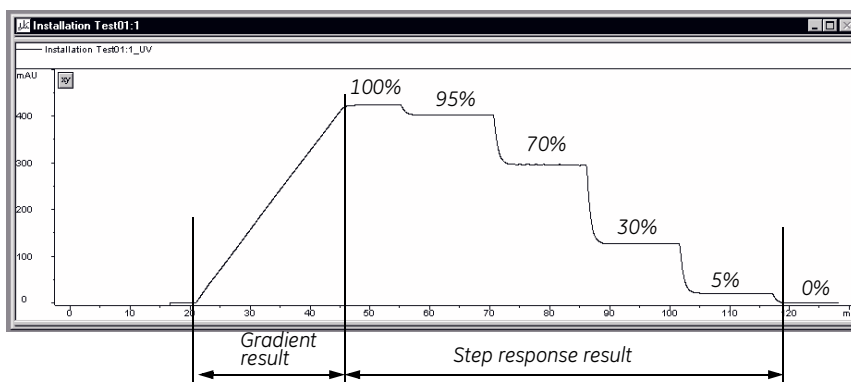
- 3 Select the appropriate system from the **For system** list.
- 4 Click **Run**. The Method Wizard is started.
- 5 Select **Installation_Test** from the **Main Selection** list and click **Run**.



- 6 Click **Next** in the **Evaluation Procedures** window.
- 7 Click **Next** in the **Method Information** window.
- 8 Make sure that the compression compensation value for water, $4.6 \times 10^{-10} \text{ Pa}^{-1}$, is set in Pump P-905 (refer to section 6.2.2 *Setting compression compensation*).
- 9 Click **START** in the **Result Name** window to start the installation test.

The progress of the test is monitored in the **System Control** module. The installation test run time is approximately 30 min.

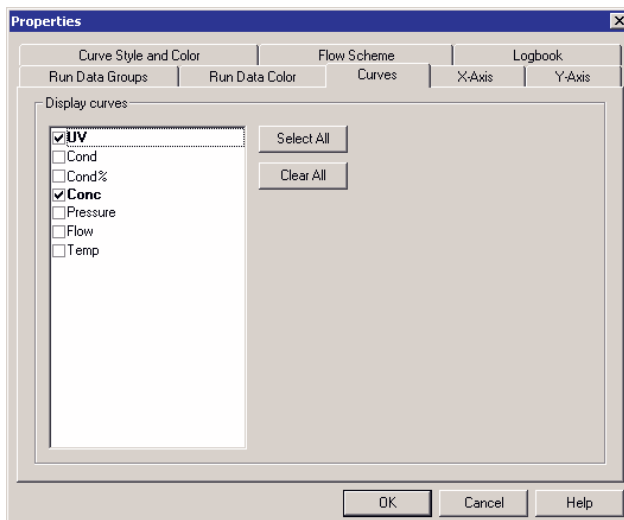
When the test is finished, the printer automatically prints the chromatogram and the test results.



Customizing the Curves pane

To customize the Curves pane:

- 1 Right-click in the **Curves** pane and select **Properties**.
- 2 Click the **Curves** tab.



- 3 Select the following curves to be displayed:

- UV
- Conc

Clear all other curves. Click **OK**.

6.4 Evaluating the installation test results

6.4.1 Automatic evaluation

The system automatically prints out the test result when the test is finished. The print-out consists of a chromatogram and an evaluation of the test result.

- If the gradient test result is **OK**, the print-out says **"Gradient linearity accepted"**.
- If the step response test result is OK, the print-out says **"Step response accepted"**.
- If the UV response test result is OK, the print-out says **"UV response accepted"**.

If any of the evaluated values falls outside the specified range, go to section 6.5 *Correcting faulty evaluation results*.

6.4.2 Manual evaluation

If your chromatography system differs from the standard configuration, for example, if optional components have been installed, the automatic evaluation may not give a reliable result. A manual evaluation is required.

- 1 Minimize the run data window to access the Main menu.
- 2 Click on  in the results window and then double-click on the **Installation Test01** icon to open the result file.
- 3 Maximize the chromatogram window by clicking on  in the upper right corner.
- 4 Click in the **Curves** window with the right mouse button and select **Properties**.
- 5 Click on the **Curves** tab and select the following curves to displayed:
 - **Installation Test01:1_UV1_265nm@01,SMTH**
 - **Installation Test01:1_UV2_254nm@02,SMTH**
 - **Installation Test01:1_UV3_280nm@03,SMTH**
 - **Installation Test01:1_Conc**
- 6 Press **OK**.

7 Click on the UV curve name in the upper left corner of the chromatogram window and read the absorbance for the steps corresponding to **Installation Test01:1_UV1_265nm@01,SMTH**. Right click in the Curves window and click on the "Marker". Move the vertical marker to the constant section of each plateau by dragging it. Enter the absorbance values (in mAU) in column 2 in the Step response table of the Test record (see page 26), leaving out the decimals.

8 Read the absorbance for the plateaus corresponding to 0% B and 100% B for the curves (click on the curve name to change the curve reading):

- **Installation Test01:1_UV1_265nm@01,SMTH**
- **Installation Test01:1_UV2_254nm@02,SMTH**
- **Installation Test01:1_UV3_280nm@03,SMTH**

Enter the values in column 2 in the UV response table of the Test record (see page 26).

9 Click on **Print** under **File** to print out the chromatogram.

Evaluating the gradient

Place a ruler along the gradient part of curve

Installation Test01:1_UV1_265nm@01,SMTH in the printed report.

The curve should be linear between 10% B and 90% B and void of discontinuities.

Evaluating the step response

Calculate the relative adsorption plateau heights for curve

Installation Test01:1_UV1_265nm@01,SMTH as follows:

- 1 Subtract the base line value (0% B) from each of the values in column 2 in the Step response table of the Test record (see page 26) and enter the results in column 3.
- 2 Divide each value in column 3 by the base line corrected value corresponding to 100% B, multiply by 100 and enter the results in column 4.

The values of column 4 should all fall within the intervals given in column 5.

Evaluating the UV response

Calculate the UV response ratios in the following way:

- 1 Subtract the base line values (0% B) corresponding to each UV curve from the values in column 2 of the UV response table of the Test record (see page 26) and enter the results in column 3.
- 2 Calculate the absorbance ratios 265 nm/254 nm and 265 nm/280 nm using the values of column 3 and enter the results in column 4.

The ratios obtained should all fall within the intervals given in column 5.

6.5 Correcting faulty evaluation results

Should any of the evaluated values fall outside the specified range, proceed as follows:

If the system differs from the standard configuration, evaluate the result manually.

If the faulty evaluation result remains, continue below.

6.5.1 Faulty gradient

- The mixer is faulty.
- Disturbances – may arise from air in the pump, pump valves or bad sealings in the pump. Refer to the Pump P-905 User Manual.

6.5.2 Faulty step response

- If all values are faulty – air in the pump or a faulty pump.
- 5% and 95% faulty – bad sealing in the pumps (5% faulty = pump module B, 95% faulty = pump module A).

7 Test record

Date:

ÄKTAmicro serial no.:

7.1 Gradient test result

Gradient linear from % B to% B. (10 - 90%)

7.2 Step response test result

Step response table:

1 Programmed Conc. %B	2 Value read	3 Baseline corrected value	4 Normalized value	5 Allowed interval
100				
95				94 – 96
70				69 – 71
30				29 – 31
5				4 – 6
0				

7.3 UV response test result

UV response table:

1 Wavelength [nm]	2 Value read		3 Baseline cor- rected value	4 Absorbance ratio	5 Allowed interval
	100%B	0%B			
254					
265/254					1.11 – 1.26
265					
265/280					1.26 – 1.53
280					

8 Installation record

Check	Sign	Remarks
1 Unpacking • Contents according to packing lists. • All packing material removed. • No visible damage.		
2 Installation • Injection valve waste tubings (port 4 and 5, marked W1 and W2) to waste reservoir. • Column holder installed. • Computer and printer installed. • UniNet 1 cabling installed. • Mains power cabling installed.		
3 Installation test • Solutions prepared. • Tubings to piston seal rinsing system in 20% ethanol. • ÄKTAmicro prepared. • Installation Test method run. • Installation Test results evaluated. • Test Record completed. • Registration Form completed. • Test Record and copy of Registration form stored in System Logbook. • Registration form posted to Service Administration. • Installation Guide stored in User Manual box for future use.		

9 Registration form

IMPORTANT!

WARRANTY REGISTRATION INFORMATION

Please ensure that this form is completed and returned to Service Administration
to register the users' equipment under warranty.

Name:

Institute/company:

Address:

Department/location:

Post Code:

Phone Number: Fax Number:

End Users:..... E-mail:

Date of Installation: Quote No:

Customer Order No: Invoice No:

Support Agreement purchased with the instrument: Y / N

If YES give details:

Installer (name):

Signature of Installer:.....

Installation Accepted:.....Date:.....

Note: Fill in serial numbers over-leaf.

10 Components

ÄKTAmicro serial number:

QTY	Part Number	Description	Serial Number
		System rack	
		Mixer M-925	
		Monitor UV-900	
		Pump P-905	
		Monitor pH/C-900	
		INV-917	
		SV-903 (A)	
		SV-903 (B)	
		Computer	
		Computer display	

For local office contact information, visit
www.gelifesciences.com/contact

GE Healthcare Bio-Sciences AB
Björkgatan 30
751 84 Uppsala
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GE Healthcare Europe GmbH
Munzinger Strasse 5,
D-79111 Freiburg,
Germany

GE Healthcare UK Ltd
Amersham Place,
Little Chalfont,
Buckinghamshire, HP7 9NA,
UK

GE Healthcare Bio-Sciences Corp
800 Centennial Avenue,
P.O. Box 1327,
Piscataway, NJ 08855-1327,
USA

GE Healthcare Bio-Sciences KK
Sanken Bldg. 3-25-1,
Hyakunincho, Shinjuku-ku,
Tokyo 169-0073,
Japan



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